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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	**Application No.** 10/582,974	**Applicant(s)** YAMAMOTO, NAOTAKE	
	Examiner SANTIAGO GARCIA	**Art Unit** 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _19 January 2010_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-13_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-13_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 01/19/10 have been fully considered but they are not persuasive. On pages 11-14 applicant argues that the added limitation **"wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna"** to all independent claims is not taught by in any of the cited references. Examiner respectfully disagrees. The reason being that the common limitation added to all independent claims "wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna" is taught by Eidson in fig. 13 which discloses an antenna 1240 where repetitive pulses are transmitted. Furthermore, it would be very common for the system in Yamamoto be receiving the pulses from an antenna.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-7, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Non-patent literature "Adaptive internally turbo-coded ultra wideband-impulse radio (AITC-UWB-

IR) by Yamamoto N Et Al, published on May 11, 2003 in view of Pub. No. 20040047284 to Eidson.

As per claim 1

Yamamoto teaches:

A transmitting method in an ultra-wideband communication system performing communications by sending repetitive pulse trains to a communication path said transmitting method comprising:

"assuming that m-piece pulses are transmitted per one bit of information bits (Yamamoto, II. UWB-IR, "A. Every transmitter sends Ns pulses for each data bit." Ns pulses are equal to "m-piece pulses".)

("m" is a natural number not less than 2)" (Yamamoto, Intro, In the UWB-IR method systems repeats and transmits pulses per each bit." If there is the repetition of pulses m can not be less than 1),

and that a coded rate is (k/n) ("k" is a natural number not less than 1,

and "n" is a natural number not less than 2) (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.)

"transforming a k-bit information bit train to (k*m)-piece pulses in total" (Yamamoto, Fig. 4, Where di represents each bit of k-bit information bit train. The k-bit information train goes into the turbo encoder to get encoded. The di.ns bits are the output of the turbo encoder which is

the input to the UWB transmitter. The encoded bits are furthered coded with repetition block code in the turbo encoder. The di.ns then form n-piece repetitive bit trains. These repetitive bit trains then get formed into (k*m) piece pulses in total by a pulse generator inside the UWB transmitter. S tr (k) (t) is formed which is the transmitted signal of the UBW-IR system which is (k*m)-piece pulses in total.");

"and transmitting sequentially the (k*m)-piece pulses to the communication path" (Yamamoto, Fig. 4 Out going of the UWB Transmitter. In the UWB transmitter [s tr (k) (t)] = (k*m)-piece pulses is formed which is the transmitted signal of the UBW-IR system. An impulse radio signal is composed of a number of sequential or parallel pulses.)

"wherein the (k*m)-piece pulses are composed of n-piece repetitive pulse trains," (Yamamoto, Fig. 4 (k*m)-piece pulses the output of UWB transmitter. The di.n encoded bits are equal to n-piece bits. The di.n bits are further coded using repetition block code forming n-piece bit trains. The n-piece bit trains are transformed to n-piece pulse trains by the pulse generator inside the UWB transmitter.

Impulse radio systems can deliver one or more data bits per pulse; however, impulse radio systems more typically use pulse trains, not single pulses, for each data bit. The impulse radio transmitter produces and outputs a train of pulses for each bit of information."

Yamamoto does not teaches: **"and at least two pieces of the n-piece repetitive pulse trains possess lengths different from each other and <u>wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna "</u>**

Eidson teaches, "and at least two pieces of the n-piece repetitive pulse trains possess lengths different from each other" (Eidson, Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data) and "**wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna** (Eidson, fig. 13 antenna 1240. Furthermore it is common for the system in Yamamoto be receiving the pulses from an antenna)**".**

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use Eidson's teachings of having two sets of information to be transmitted with different lengths to put emphasis on the systematic information as well as an antenna in Yamamoto's system to transmit wirelessly.

The motivation would be to have a more reliable system by putting more emphasis on the actual bits instead of the coded bits and the antenna to be able to transmit wirelessly.

1. As per claim 2:

Yamamoto teaches, **A receiving method in an ultra-wideband communication system performing communications by sending repetitive pulse trains to a communication path said receiving method comprising:**

receiving a transmit signal as n-piece received pulse trains (Yamamoto, Fig.4 Transmitted signal from UWB transmitter to the pulse correlator. R(t) is the received signal),

the transmit signal being n-piece repetitive pulse trains transmitted (Yamamoto, Fig.4 The UWB transmitter is transmitting n-piece repetitive pulse trains.) **after a k-bit information bit train is encoded to an n-bit encoded bit train** (Yamamoto, Fig.4 K-bit information is encoded in the turbo encoder.) **at a coded rate of (k/n) ("k" is a natural number not less than 1, and "n" is a natural number not less than 2),** (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.)

and subsequently the n-bit encoded bit train is transformed to the n-piece repetitive pulse trains; (Yamamoto, Fig.4 Output of the UWB transmitter is the transmitted signal composed of repetitive pulse trains.)

outputting number of repetitive pulses composing each of the n-piece received pulse trains, (Yamamoto, Fig. 4 UWB transmitter is outputting the pulse trains comprising of n-piece pulse trains which are then transmitted therefore received pulses by the receiver by the pulse correlator.)

based on pulse train information or bit train information received beforehand; (Yamamoto, Fig.4 Bit train information is coming out of Turbo encoder then going into the UWB transmitter to form pulse train information which then the pulse train information is the output of the UWB transmitter.)

correlating individually pulses composing the n-piece received pulse trains (Yamamoto, Fig.4 Pulse correlator receives the n-piece pulse trains which are then correlated by the pulse

correlator.) **with a predetermined template wave shape,** (Yamamoto, Fig.2 shows the predetermined wave shape. Fig.2 shows the template signal for the typical received waveform in Fig.1. Fig. 3 also shows the normalized signal correlation function.) **thereby outputting correlation values;**(Yamamoto, Fig.4 output of pulse train correlator.) **thereby providing n-piece integrated values;**(Yamamoto, Fig.4 Output of pulse train integrator.) **making soft decision for the n-piece received pulse trains** (Yamamoto, Fig.4 The turbo decoder is able to make the soft decision. The output of the pulse train integrator goes into the turbo decoder.) **based on the n-piece integrated values, thereby outputting the soft decision results for n bits;**(Yamamoto, Fig.4 The turbo decoder is receiving the integrated values and making the soft decision resulting in n bits which is the out put of the decoder.) **and making hard decision in decoding** (Yamamoto, Fig.4 Hard decision unit is making the hard decision.) **for the n-piece received pulse trains based on the soft decision results for n bits,**(Yamamoto, Fig.4 Input of the turbo decoder is n bits coming from the output of the pulse train integrator. Therefore the n-piece received pulse trains results in n bits.) **thereby outputting the k-bit information bit train as a decoded information signal.** (Yamamoto, Fig.4 output of hard decision block.)

Yamamoto does not teaches: "integrating the correlation values as many as the number of repetitive pulses <u>and at least two pieces of the n-piece repetitive pulse trains possess lengths different from each other and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna</u> "

Eidson teaches, "integrating the correlation values as many as the number of repetitive pulses and at least two pieces of the n-piece repetitive pulse trains possess lengths different from each other " (Eidson, Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data) and "wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna (Eidson, fig. 13 antenna 1240)"

.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use Eidson's teachings of having two sets of information to be transmitted with different lengths to put emphasis on the systematic information as well as an antenna in Yamamoto's system to transmit wirelessly.

The motivation would be to have a more reliable system by putting more emphasis on the actual bits instead of the coded bits and the antenna to be able to transmit wirelessly.

As for claim 3:

Yamamoto and Fischer teach:

A transmitting device usable in an ultra-wideband communication system performing communications by sending repetitive pulse trains to a communication path, said transmitting device comprising:

an encoder operable to encode a k-bit information bit train (Yamamoto, Fig.4 Multiple dis represent k-bit information bit trains which then are the input of the Turbo encoder) **to an n-bit encoded bit train** (Yamamoto, Fig.4) **at a coded rate of (k/n) ("k" is a natural number not less than 1, and "n" is a natural number not less than 2),** (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.) **on condition that m-piece pulses are transmitted per one bit of information bits** (Yamamoto, II. UWB-IR, "A. Every transmitter sends Ns pulses for each data bit." Ns pulses are equal to "m-piece pulses".)

("m" is a natural number not less than 2) (Yamamoto, Intro, In the UWB-IR method systems repeats and transmits pulses per each bit." If there is the repetition of pulses m can not be less than 1) **and the coded rate is (k/n);** (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.) **and a transmitting unit operable to generate n-piece repetitive pulse trains** (Yamamoto, Fig 4 UWB transmitter can generate n-piece repetitive pulse trains.) **based on the n-bit encoded bit train encoded by said encoder,** (Yamamoto, Fig 4 The output of turbo encoder produces the n-bit encoded bit train then that bit train goes into the UBW therefore it is based on n-bit encoded bit train.) **thereby transmitting sequentially the n-piece repetitive pulse trains to the communication path,** (Yamamoto, Fig 4 The UWB transmitter is transmitting the n-piece repetitive pulse trains to the communication path. An impulse radio signal is composed of a number of sequential or parallel pulses.) **wherein pulses included in the n-piece repetitive pulse trains transmitted by said transmitting unit amount to (k*m) pieces in total,** (Yamamoto, Fig. 4, Where di represents each bit of k-bit information bit train. The k-bit

information train goes into the turbo encoder to get encoded. The di.ns bits are the output of the turbo encoder which is the input to the UWB transmitter. The encoded bits are furthered coded with repetition block code in the turbo encoder. The di.ns then form n-piece repetitive bit trains. These repetitive bit trains then get formed into (k*m) piece pulses in total by a pulse generator inside the UWB transmitter. S tr (k) (t) is formed which is the transmitted signal of the UBW-IR system which is (k*m)-piece pulses in total.") .

Yamamoto does not teaches: "integrating the correlation values as many as the number of repetitive pulses <u>and at least two pieces of the n-piece repetitive pulse trains possess lengths different from each other and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna "</u>

Eidson teaches, "integrating the correlation values as many as the number of repetitive pulses <u>and at least two pieces of the n-piece repetitive pulse trains possess lengths different from each other</u> " (Eidson, Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data) and "<u>wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna (Eidson, fig. 13 antenna 1240)"</u>

.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use Eidson's teachings of having two sets of information to be transmitted with

different lengths to put emphasis on the systematic information as well as an antenna in Yamamoto's system to transmit wirelessly.

The motivation would be to have a more reliable system by putting more emphasis on the actual bits instead of the coded bits and the antenna to be able to transmit wirelessly.

As for claim 4:

Yamamoto in view of Eidson further teaches:

The transmitting device as defined in claim 3.

of the n-piece repetitive pulse trains transmitted by said transmitting unit. (Yamamoto, Fig.4 output of the UWB transmitter.)

a transmitting control unit operable to generate control information on number of the repetitive pulses included in each train (Eidson, fig.12 element 1224, which makes the pulses of Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data **).**

As per claim 5:

Yamamoto in view of Eidson further teaches:

The transmitting device as defined in claim 4,

wherein said transmitting control unit is operable to acquire communication path information on the communication path, (Yamamoto, fig.4 although not clearly shown as a control unit the UWB transmitter as adapted with Eideson shows a multi-user interface adding to the channel as well as the noise therefore having the ability to acquire communication path information) thereby generating the control information based on the acquired communication path information. (Yamamoto, the output of the noise summer in fig. 4).

As per claim 6:

Yamamoto in view of Eidson further teaches:

The transmitting device as defined in claim 4

to repetitively generate a plurality of pulses for each encoded bit of the n-bit encoded bit train encoded by said encoder, (Yamamoto, Fig.4 The input is k-bits which get encoded by the turbo encoder and turned into n-bit train encoded by the turbo encoder.) **thereby outputting the n-piece repetitive pulse trains,** (Yamamoto, Fig.4 UWB output the n-piece repetitive pulse trains.)

the plurality of pulses being predetermined according to a kind of each encoded bit. (Yamamoto, Fig.4 The turbo encoder also uses repetition code. Meaning if the encoded bit is 0 the code could be 000. By having the repetitive bit trains which are formed by using repetition code going into the pulse generator of the UWB transmitter the system is transmitting a plurality of pulses predetermined per kind of bit if each encoded bit 0 or 1.)

, wherein said transmitting control unit comprises:

a pulse generator operable (Yamamoto, a UWB transmitter inherently has a pulse generator),

in accordance with the control information generated by said transmitting control unit, (Yamamoto, Fig.4 The turbo encoder also uses repetition code. Meaning if the encoded bit is 0 the code could be 000. By having the repetitive bit trains which are formed by using repetition code going into the pulse generator of the UWB transmitter the system is transmitting a plurality of pulses predetermined per kind of bit if each encoded bit 0 or 1)

13. As for claim 7:

Yamamoto in view of Eidson further teaches:

The transmitting device as defined in claim 6,

the number of repetitive pulses of the n-piece repetitive pulse trains generated by said pulse generator. (Yamamoto, Fig 4 The turbo encoder is further using repetition block code to turn the encoded bits into repetitive bit trains. The repetitive bit trains then go to the pulse generator to be formed into repetitive pulses.)

wherein said transmitting control unit is operable to transmit, as pulse train information, (Eidson, fig.12 element 1224, which makes the pulses of Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data **).**

14. As for claim 11:

Yamamoto in view of Eidson further teaches:

The transmitting device as defined in claim 10,

the number of repetitive bits of the n-piece repetitive bit trains generated by said bit train generator (Yamamoto, Fig.3 Before the pulse trains are formed into pulses the pulse generator must receive bit trains that will eventually represent pulse trains after going threw the pulse generator.).

wherein said transmitting control unit is operable to transmit, as bit train information, (Eidson, fig.12 element 1224, which makes the pulses of Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data).

As per claim 8:

Yamamoto in view of Eidson teaches:

The transmitting device as defined in claim 4,

wherein said encoder outputs the n-bit encoded bit train in the form of an n-bit parallel format encoded bit train, and wherein said transmitting unit comprises:

a pulse generator operable to repetitively generate a plurality of pulses for each encoded bit (Yamamoto, Fig.3 A conventional UWB transmitter contains a pulse generator taking in encoded

bits from an encoder to produce a plurality of pulses.) **of the n-bit parallel format encoded bit train outputted by said encoder,** (Yamamoto, Fig.3 output of the turbo encoder is coming out in parallel as shown in the figure.) **thereby outputting n-piece parallel format repetitive pulse trains,**(Yamamoto, Fig.3 A UWB transmitter can out put serial or parallel pulse trains.) **and a parallel-to-serial converter operable to convert the n-piece parallel format repetitive pulse trains outputted by said pulse generator to n-piece serial format repetitive pulse trains,** (Yamamoto, Fig.3 UWB-IT conventional transmitter as shown in fig.3 can out put signals in parallel or serial format according to traditional impulse radio transmitter therefore it is assume that the UBW has a parallel-to-serial converter.) **thereby sequentially transmitting the n-piece serial format repetitive pulse trains to the communication path,** (Yamamoto, Fig.3 Output of the UWB-IT transmitter. UWB-IT conventional transmitter as shown in fig.3 can out put their signals in parallel or serial format.) **in such a manner that pulses included in the n-piece repetitive pulse trains amount to (k*m) pieces in total,** (Yamamoto, Fig. 4, Where di represents each bit of k-bit information bit train. The k-bit information train goes into the turbo encoder to get encoded. The di.ns bits are the output of the turbo encoder which is the input to the UWB transmitter. The encoded bits are furthered coded with repetition block code in the turbo encoder. The di.ns then form n-piece repetitive bit trains. These repetitive bit trains then get formed into (k*m) piece pulses in total by a pulse generator inside the UWB transmitter. S tr (k) (t) is formed which is the transmitted signal of the UBW-IR system which is (k*m)-piece pulses in total.")

the plurality of pulses being predetermined according to a kind of each encoded bit; (Yamamoto, Fig.4 The turbo encoder also uses repetition code. Meaning if the encoded bit is 0

the code could be 000. By having the repetitive bit trains which are formed by using repetition code going into the pulse generator of the UWB transmitter the system is transmitting a plurality of pulses predetermined per kind if each encoded bit 0 or 1.)

the number of each repetitive pulses composing the n-piece repetitive pulse trains, (Yamamoto, Fig.4 The turbo encoder also uses repetition code. Meaning if the encoded bit is 0 the code could be 000. By having the repetitive bit trains which are formed by using repetition code going into the pulse generator of the UWB transmitter the system is transmitting a plurality of pulses predetermined per kind if each encoded bit 0 or 1.)

wherein said pulse generator determines, in accordance with the control information generated by said transmitting control unit, (Eidson, fig.12 element 1224, which makes the pulses of Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data **)**

and at least two pieces of the n-piece repetitive pulse trains are composed of repetitive pulses of different numbers. (Eidson, Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data.)

As per claim 9:

Yamamoto in view of Eidson teaches:

The transmitting device as defined in claim 4,

wherein said encoder outputs the n-bit encoded bit train in the form of an n-bit serial format encoded bit train, and wherein said transmitting unit comprises:

a serial-to-parallel converter operable to convert the n-bit serial format encoded bit train outputted by said encoder (Yamamoto, Fig.4 The output of the encoder is coming out parallel. The conventional UWB transmitting device comprises of a serial-to-parallel converter.) **to an n-bit parallel format encoded bit train,** (Yamamoto, Fig.4 Output of the turbo encoder is in parallel) **a pulse generator operable to repetitively generate a plurality of pulses for each encoded bit** (Yamamoto, Fig.4 A UWB transmitter has a pulse generator. The UWB system outputs a plurality of pulses per encoded bit.) **of the n-bit parallel format encoded bit train outputted by said encoder,**(Yamamoto, Fig.4 The turbo encoder is outputting parallel bit trains) **thereby outputting n-piece parallel format repetitive pulse trains,** (Yamamoto, Fig.4 the output of the encoder goes into the UWB transmitted and there the information bit train gets turned into pulse trains by the pulse generator inside the UWB transmitter.) **and a parallel-to-serial converter operable to convert the n-piece parallel format repetitive pulse trains outputted by said pulse generator to n-piece serial format repetitive pulse trains,** (Yamamoto, Fig.4 The conventional UWB transmitter contains a parallel-to-serial converter after the pulse generator to be able to transmit the pulse trains serial sequential format.) **thereby sequentially transmitting the n-piece serial format repetitive pulse trains to the communication path,** (Yamamoto, Fig.4 The UWB transmitter can transmit parallel or serial pulse trains.) **in such a manner that pulses included in the n-piece repetitive pulse trains amount to (k*m) pieces in total,** (Yamamoto, Fig. 4 (k*m)-piece pulses the output of UWB

transmitter. The di.n encoded bits are equal to n-piece bits. The di.n bits are further coded using repetition block code forming n-piece bit trains. The n-piece bit trains are transformed to n-piece pulse trains by the pulse generator inside the UWB transmitter.

Impulse radio systems can deliver one or more data bits per pulse; however, impulse radio systems more typically use pulse trains, not single pulses, for each data bit. The impulse radio transmitter produces and outputs a train of pulses for each bit of information.")

the plurality of pulses being predetermined according to a kind of each encoded bit;

(Yamamoto, Fig.4 The turbo encoder also uses repetition code. Meaning if the encoded bit is 0 the code could be 000. By having the repetitive bit trains which are formed by using repetition code going into the pulse generator of the UWB transmitter the system is transmitting a plurality of pulses predetermined per kind if each encoded bit 0 or 1.)

the number of each repetitive pulses composing the n-piece repetitive pulse trains,

(Yamamoto, Fig.4 The turbo encoder also uses repetition code. Meaning if the encoded bit is 0 the code could be 000. By having the repetitive bit trains which are formed by using repetition code going into the pulse generator of the UWB transmitter the system is transmitting a plurality of pulses predetermined per kind if each encoded bit 0 or 1.)

wherein said pulse generator determines, in accordance with the control information generated by said transmitting control unit

(Eidson, fig.12 element 1224, which makes the pulses of Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data **),**

and at least two pieces of the n-piece repetitive pulse trains are composed of repetitive pulses of different numbers. (Eidson, Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data.)

As for claim 10:

Yamamoto in view of Eidson teaches:

The transmitting device as defined in claim 4,

wherein said transmitting unit comprises:

a bit train generator operable to repeat, for a plurality of times,

(Yamamoto, Fig.4 "The AITC-UWB-IR chooses the code rate of the Turbo code, the number of repetition block code." By using repetition block code a pulse train generator has to be present in this system to repeat the encoded bits. In other words if the encoded bits are 01 then one possible output of the pulse train generator would be 000 representing the bit 0 and 1111 representing the bit 1.) **each bit of the n-bit encoded bit train encoded by said encoder to generate n-piece repetitive bit trains**; (Yamamoto, By using repetition block code encoded n-bits are going into a bit train generator and producing repetitive bit trains to represent each encoded bit.) **and a pulse generator operable to generate a pulse for each bit of the n-piece repetitive bit trains generated by said bit train generator,** (Yamamoto, Fig.4 The UWB transmitter must have a pulse generator to transmit pulse train groups. The output of the bit train generator goes into the

pulse generator to generate and then transmit the repetitive pulse trains. **) thereby transmitting the generated pulse to the communication path,** (Yamamoto, Fig. 4 Out going of the UWB Transmitter. The generated pulse would be coming out of the pulse generator to an antenna to be transmitted. The pulse would be coming out In the UWB transmitter [s tr (k) (t)] = (k*m)-piece pulses is formed which is the transmitted signal of the UBW-IR system. An impulse radio signal is composed of a number of sequential or parallel pulses.) **the number of each repetitive bits composing the n-piece repetitive bit trains,** (Yamamoto, Fig.3 Before the pulse trains are formed into pulses the pulse generator must receive bit trains that will eventually represent pulse trains after going threw the pulse generator.) **in such a manner that bits included in the n-piece repetitive bit trains amount to (k*m) pieces in total,** (Yamamoto, Fig. 4 Out going of the UWB Transmitter. In the UWB transmitter [s tr (k) (t)] = (k*m)-piece pulses is formed which is the transmitted signal of the UBW-IR system. An impulse radio signal is composed of a number of sequential or parallel pulses.)

the pulse being predetermined according to a kind of each bit (Eidson, fig.12 element 1224, which makes the pulses of Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data **) ,**

wherein said bit train generator determines, in accordance with the control information generated by said transmitting control unit, (Eidson, fig.12 element 1224, which makes the pulses of Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains

with them having different lengths by having varying numbers in the repetition group of digital data)

and at least two pieces of the n-piece repetitive bit trains are composed of repetitive bits of different numbers (Eidson, Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data).

21. As per claim 12:

Yamamoto teaches:

A receiving device usable in an ultra-wideband communication system performing communications by sending repetitive pulse trains to a communication path, said receiving device comprising:

a receiving unit operable to receive a transmit signal as n-piece received repetitive pulse trains, (Yamamoto, Fig.4 Transmitted signal from UWB transmitter to the pulse correlator. R(t) is the received signal.)

the transmit signal being n-piece repetitive pulse trains transmitted after a k-bit information bit train is encoded (Yamamoto, Fig.4 The UWB transmitter is transmitting n-piece repetitive pulse trains. K-bit information is encoded in the turbo encoder.**)** **to an n-bit encoded bit train at a coded rate of (k/n) ("k" is a natural number not less than 1, and "n" is a natural number not less than 2),** (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo

coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.)

and subsequently the n-bit encoded bit train is transformed to the n-piece repetitive pulse trains; (Yamamoto, Fig. 4 Output of the UWB transmitter is the transmitted signal which is repetitive pulse trains.) **a pulse wave-shape correlator operable to correlate individually pulses** (Yamamoto, Fig. 4 Pulse correlator.) **composing the n-piece received repetitive pulse trains with a predetermined template wave shape,** (Yamamoto, Fig.2 shows the predetermined wave shape. Fig.2 shows the template signal for the typical received waveform in Fig.1) **thereby outputting n-piece repetitive correlation value trains in correspondence with the n-piece received repetitive pulse trains**; (Yamamoto, Fig.4 Output of the pulse correlator corresponds to received repetitive pulse trains before hand.) **based on pulse train information or bit train information received beforehand,** (Yamamoto, Fig.4 The pulse trains information is being transmitted by the UBW transmitter. At the same time those pulses are representing the bit trains as well.) **n-piece repetition numbers for the n-piece repetitive correlation value trains outputted by said pulse wave-shape correlator;** (Yamamoto, Fig.4 Output of the correlator.) **an integrator operable to divide into n intervals the n-piece repetitive correlation value trains outputted by said pulse wave-shape correlator,**(Yamamoto, Fig.4 Pulse train integrator.) **and to integrate the n-piece repetitive correlation value trains for each divided interval,** (Yamamoto, Fig.4 Pulse train integrator.) **thereby outputting n-piece integrated values;** (Yamamoto, Fig.4 Output of the pulse train integrator.) **a decoder operable to make soft decision for the n-piece received repetitive pulse trains** (Yamamoto, Fig.4 Turbo decoder.) **based on the n-piece integrated values outputted by said integrator,** (Yamamoto,

Fig.4 The output of the integrator. **) thereby outputting the soft decision results for n bits;** (Yamamoto, Fig.4 Output of the turbo decoder.) **and a decision unit operable to make hard decision in decoding for the n-piece received pulse trains** (Yamamoto, Fig.4 Hard decision block) **based on the soft decision results for n bits outputted by said decoder,** (Yamamoto, Fig.4 the soft decision is going into the hard decision block.) **thereby outputting the k-bit information bit train as a decoded information signal.** (Yamamoto, Fig.4 Output of the hard decision block)

Yamamoto does not teaches: "integrating the correlation values as many as the number of repetitive pulses <u>and at least two pieces of the n-piece repetitive pulse trains possess lengths different from each other and wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna "</u> .

Eidson teaches, a receiving control unit operable to output, (Eidson, fig.16 element 1610, which makes the pulses of Fig.5 but at the receiver)

in accordance with the n-piece repetition numbers outputted by said receiving control unit, (Eidson, Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data.), and <u>wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna (Eidson, fig. 13 antenna 1240).</u>

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use Edison's teachings of having two sets of repetitive digital information to be transmitted with different lengths to put emphasis on the original k-bits information that then are encoded. The teachings of Edison would be added to the control unit of Fischer to have the ability to transmitted repetitive pulse trains with different lengths.

This method for improving the transmission method of Yamamoto was within the ordinary ability of one of ordinary skill in the art based on the teachings of Eidson transmitting two sets of digital information with different lengths from each other.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Yamamoto, Fischer and further in view of Eidson to obtain the invention of claim 12.

19. As per claim 13:

Yamamoto and Fischer teach:

A transceiving device usable in an ultra-wideband communication system performing communications by sending repetitive pulse trains to a communication path, said transceiving device comprising:

an encoder operable to encode a k-bit information bit train to an n-bit encoded bit train (Yamamoto, Fig.4 Turbo encoder) **at a coded rate of (k/n) ("k" is a natural number not less than 1, and "n" is a natural number not less than 2),** (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.) **on condition that m-piece pulses are transmitted per one**

bit of information bits ("m" is a natural number not less than 2) (Yamamoto, Intro, In the UWB-IR method systems repeats and transmits pulses per each bit." If there is the repetition of pulses m can not be less than 1) **and the coded rate is (k/n)** (Yamamoto, Fig 4 shows the code rate = 1/n. In turbo coding the input has to be at least 1 and n has to be a number greater than k so in this case n can not be less than 2.); **a transmitting unit operable to generate n-piece repetitive pulse trains based on the n-bit encoded bit train encoded by said encoder,** (Yamamoto, Fig 4 UWB transmitter unit is receiving encoded bit trains.) **thereby transmitting sequentially the n-piece repetitive pulse trains to the communication path;** (Yamamoto, Fig 4 UWB transmitter is outputting repetitive pulse trains.) **a receiving unit operable to receive n-piece repetitive pulse trains through the communication path,** (Yamamoto, Fig 4 Input of the pulse correlator.) **as n-piece received repetitive pulse trains;** (Yamamoto, Fig.4 The UWB transmitter is outputting repetitive pulse trains and therefore what is received is repetitive pulse trains) **a pulse wave-shape correlator operable to correlate individually pulses composing the n-piece received repetitive pulse trains with a predetermined template wave shape,** (Yamamoto, Fig.4 Pulse correlator.) **thereby outputting n-piece repetitive correlation value trains in correspondence with the n-piece received repetitive pulse trains;** (Yamamoto, Fig.4 Pulse correlator output.) **based on pulse train information or bit train information received beforehand,** (Yamamoto, Fig.4 Bit train information is coming out of Turbo encoder then going into the UWB transmitter to form pulse train information which then the pulse train information is the output of the UWB transmitter.) **n-piece repetition numbers for the n-piece repetitive correlation value trains outputted by said pulse wave-shape correlator;** (Yamamoto, Fig.4 Output of the correlator.) **an integrator operable to divide into n intervals the n-piece**

repetitive correlation value trains outputted by said pulse wave-shape correlator, (Yamamoto, Fig.4 The pulse train integrator.) **and to integrate the n-piece repetitive correlation value trains for each divided interval,** (Yamamoto, Fig.4 The pulse train integrator) **thereby outputting n-piece integrated values;** (Yamamoto, Fig.4 The output of the pulse train integrator.) **a decoder operable to make soft decision for the n-piece received repetitive pulse trains based on the n-piece integrated values outputted by said integrator,** (Yamamoto, Fig.4 Turbo decoder) **thereby outputting the soft decision results for n bits;**(Yamamoto, Fig.4 Output of the Turbo decoder) **and a decision unit operable to make hard decision in decoding for the n-piece received pulse trains based on the soft decision results for n bits outputted by said decoder,** (Yamamoto, Fig.4 Hard decision unit block)

thereby outputting the k-bit information bit train as a decoded information signal, (Yamamoto, Fig.4 Output of the hard decision block.) **wherein pulses included in the n-piece repetitive pulse trains transmitted by said transmitting unit amount to (k*m) pieces in total,** (Yamamoto, Fig.4 (k*m) pieces in total are coming out of the UWB transmitter and received by the pulse correlator.) **and wherein pulses included in the n-piece received pulse trains received by said receiving unit amount to (k*m) pieces in total,** (Yamamoto, Fig.4 (k*m) pieces in total are coming out of the UWB transmitter and received by the pulse correlator.)

on number of the repetitive pulses included in each train of the n-piece repetitive pulse trains transmitted by said transmitting unit; (Yamamoto, Fig. 4 The repetitive pulses are being created by input of repetitive bit trains to a pulse generator. Further using block code by the encoder the repetition is possible.)

a transmitting control unit operable to generate control information (Fischer, Fig.3 Control unit predetermines the number of pulses per bit to be transmitted.)

a receiving control unit operable to output, (Eidson, fig.12 element 1224, which makes the pulses of Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data **) .**

in accordance with the n-piece repetition numbers outputted by said receiving control unit (Eidson, fig.12 element 1224, which makes the pulses of Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data **) ,**

and at least two pieces of the n-piece repetitive pulse trains are composed of repetitive pulses of different numbers, (Eidson, Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying numbers in the repetition group of digital data.)

and at least two pieces of the n-piece repetitive pulse trains are composed of repetitive pulses of different numbers. (Eidson, Fig.5 "[0124] Thus, using PSs with different, typically shorter, lengths and in repetition groups having varying numbers for J and P." J and P would be considered to be the pulse trains with them having different lengths by having varying

numbers in the repetition group of digital data.) wherein the repetitive pulse trains themselves constitute radio waves transmitted from an antenna (Eidson, fig. 13 antenna 1240)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use Eidson's teachings in Yamamoto of having two sets of information to be transmitted with different lengths to put emphasis on the systematic information.

The motivation would be to have a more reliable system by putting more emphasis on the actual bits instead of the coded bits.

Conclusion

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SANTIAGO GARCIA whose telephone number is (571)270-5182. The examiner can normally be reached on MONDAY- FRIDAY 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh, Fan can be reached on (571) 272-3011. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000. /SG/

/CHIEH M FAN/

Supervisory Patent Examiner, Art Unit 2611